

TFT-DISPLAY DATASHEET

DATA IMAGE

Model: FG120150DSSWBG01

BRIEF SPEC.:

Main Feature

Landscape

Wide Temperature Range

Active Screen Area	245.76 x 184.32 (mm)
Diagonal Format	12,1" 4:3
Resolution	1024 X 768
Colors	262K/ 16.2M (6/8Bit)
Backlight	LED
Brightness	500 cd/m ²
LED Life Time	50K(h)
Interface	LVDS
Viewing Angle	80/80 L/R 80/80
Touchscreen	No
Power Supply	3.3 V
Module Outline	279.0 x 209.0 x 9.0 (mm)
Operation Temperature	-30 ... +85 °C
Storage Temperature	-30... +85 °C
Surface Treatment	Anti-Glare, Hardness 3H

DATA IMAGE CORPORATION

TFT Module Specification

Preliminary

ITEM NO.: FG120150DSSWBG01

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	ALEX	PRETTY	DAVID	KEN
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	2	04/AUG/15'		27

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment	Source
1	05/MAR/12'			Initial Preliminary	ESR0102015
2	04/AUG/15'	9.2 10 12	20 23 26	1. Add Inspection Condition. 2. Modify Label Dimensions. 3. Modify Outline Drawing from Rev.1 to 2.	ECR110-F70035

3. GENERAL DESCRIPTION

This module is designed for display units of Industrial Applications. The screen format is intended to support the XGA (1024(H) x 768(V)) screen and 262k (RGB 6-bits) or 16.2M color (RGB 8-bit data driver).

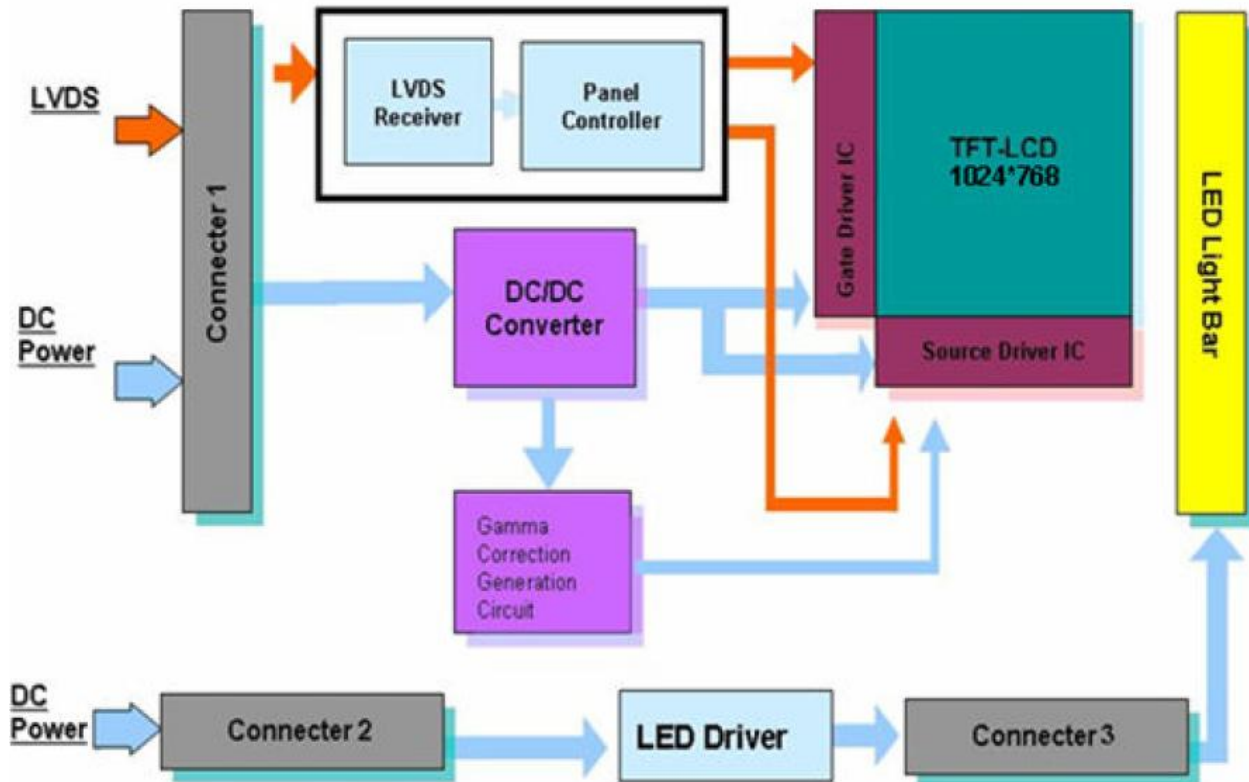
All input signals are LVDS interface compatible.

3.1 Display Characteristics

The following items are characteristics summary on the table under 25°C condition :

Items	Specifications	Unit
Screen Diagonal	12.1"	[inch]
Active Area	245.76(H) x 184.32(V)	[mm]
Pixel H x V	1024 x 768	
Pixel Pitch	0.24(H) x 0.24 (V)	[mm]
Pixel Arrangement	R.G.B.W Rectangle	
Display Mode	TN mode, Normally White	
Physical Size	279.0(W) x 209.0(H) x 9(D)	[mm]
Electrical Interface	LVDS (1 channel)	
Surface treatment	Anti-glare, Hardness 3H	
Temperature Range Operating Storage(Shipping)	-30 to + 85 -30 to + 85	[°C] [°C]
RoHS Compliance	RoHS Compliance	

3.2 Functional Block Diagram



4. ABSOLUTE MAXIMUM RATINGS

Absolute maximum ratings of the module is as follows :

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	Vin	-0.3	+3.6	[Volt]	
Operating Temperature	TOP	-30	+85	[°C]	Note1
Operating Humidity	HOP	5	90	[%RH]	
Storage Temperature	TST	-30	+85	[°C]	
Storage Humidity	HST	5	90	[%RH]	

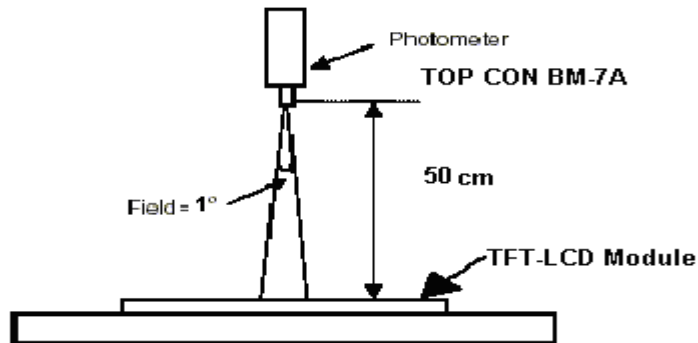
Note1 : Maximum Wet-Bulb should be 39°C and no condensation.

5. OPTICAL CHARACTERISTICS

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ_{x+}	Center $CR \geq 10$	70	80	--	deg	Note 1,4
		θ_{x-}		70	80	--		
	Vertical	θ_{y+}		70	80	--		
		θ_{y-}		70	80	--		
Contrast Ratio		CR	at optimized viewing angle	500	700			Note 1,3
Response time	Rise	Tr	Center $\theta_x = \theta_y = 0^\circ$	-	25	35	ms	Note 1,6
	Fall	Tf		-	10	20	ms	
Uniformity		B-uni	$\theta_x = \theta_y = 0^\circ$	75	--	--	%	Note 1,5
Brightness		L	$\theta_x = \theta_y = 0^\circ$	375	500	--	cd/m ²	Note 1,2
Chromaticity		x_W	Center $\theta_x = \theta_y = 0^\circ$	0.260	0.310	0.360		Note 1,7
		y_W		0.280	0.330	0.380		
		x_R		0.592	0.642	0.692		
		y_R		0.292	0.342	0.392		
		x_G		0.276	0.326	0.376		
		y_G		0.565	0.615	0.665		
		x_B		0.098	0.148	0.198		
		y_B		0.060	0.056	0.106		

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤ 1 lux, and at room temperature). The operation temperature is $25^\circ\text{C} \pm 2^\circ\text{C}$ and $IF = 110 \text{ mA/1 LED Line}$. The measurement method is shown in Note 1.

Note 1: The method of optical measurement:

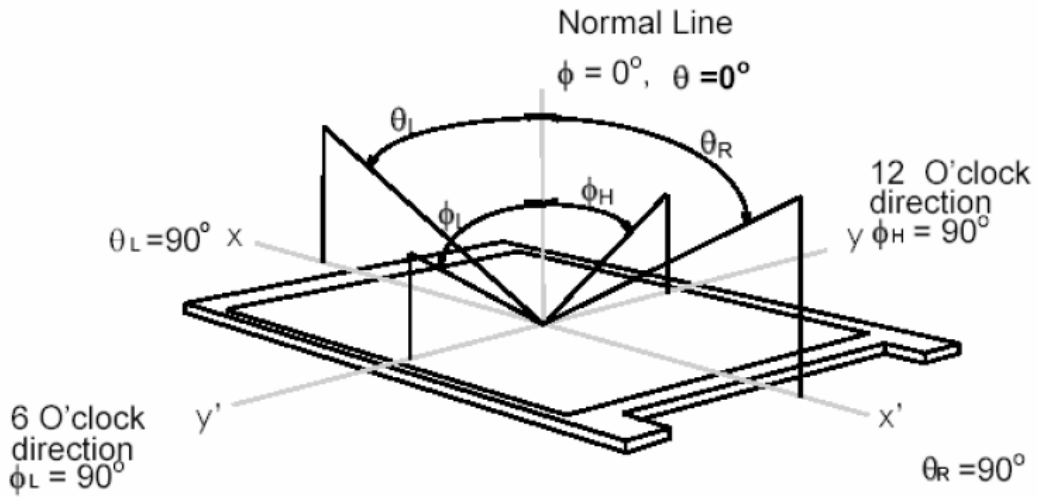


Note2: Measured at the center area of the panel and at the viewing angle of the $\theta_x=\theta_y=0^\circ$

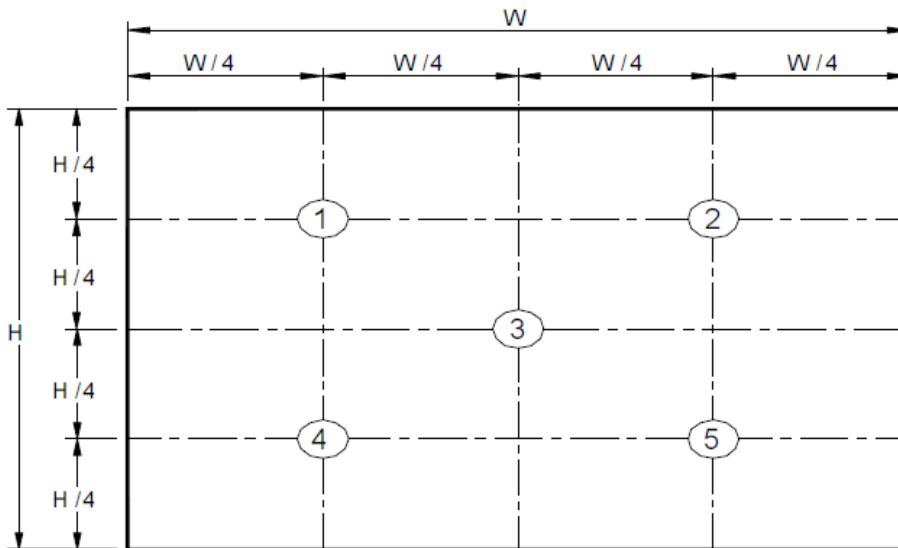
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



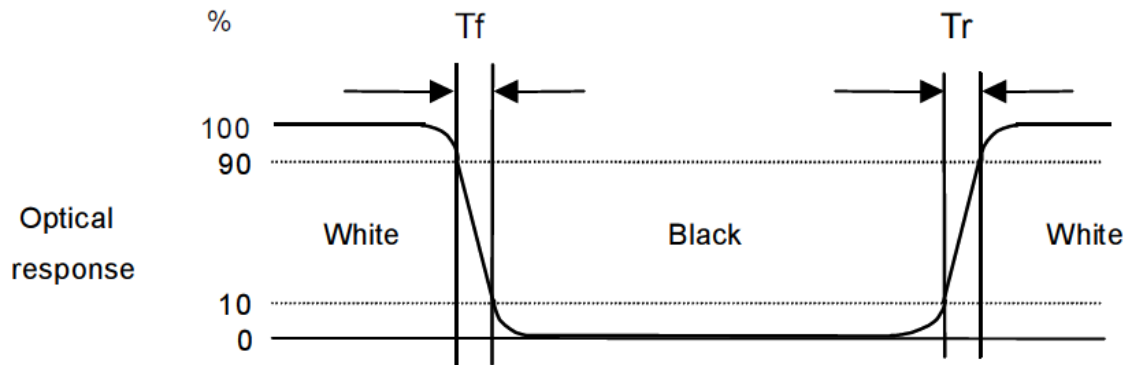
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 5 points}}{\text{Maximum luminance of 5 points}} \quad (\text{Note 5}).$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (T_r)” and the “Falling Time (T_f)” respectively. T_r and T_f are defined as following figure.



Note 7: Definition of Chromaticity:

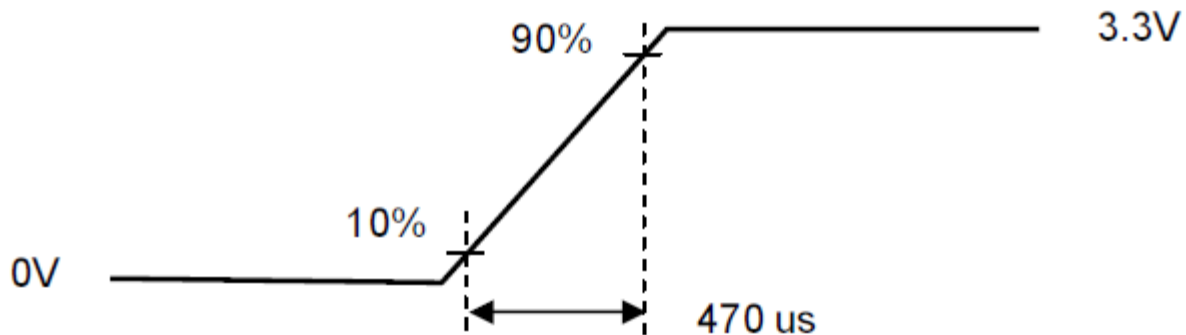
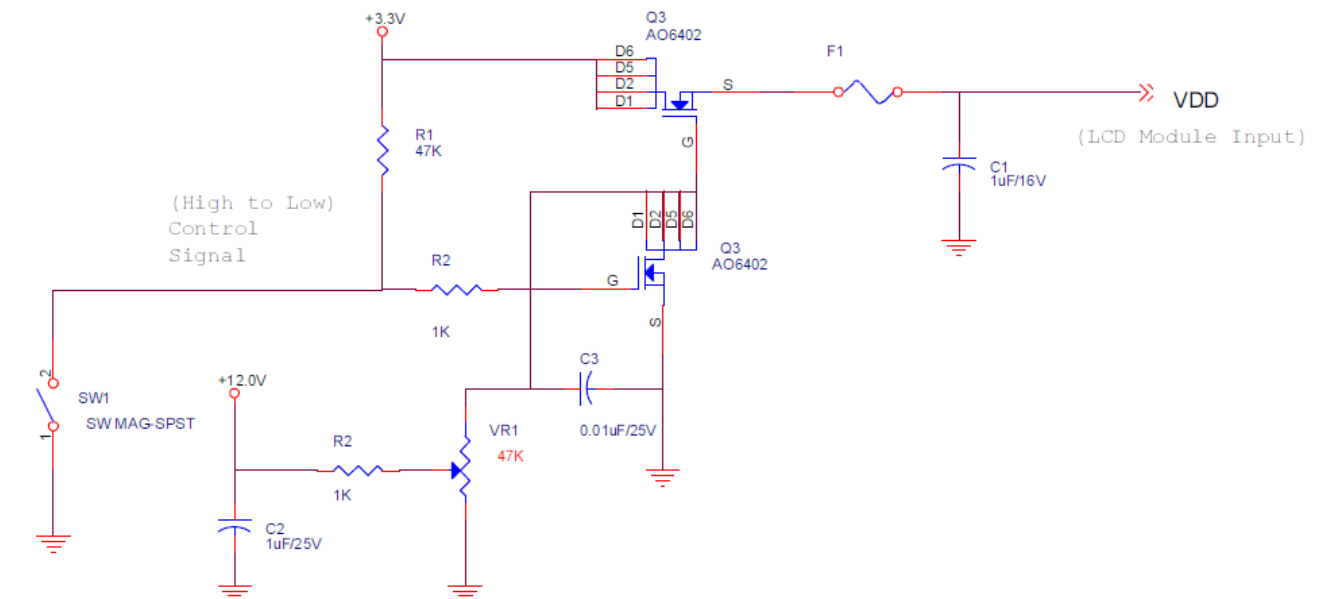
The color coordinates (x_W, y_W) , (x_R, y_R) , (x_G, y_G) , and (x_B, y_B) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

6. ELECTRICAL CHARACTERISTICS

6.1 Power Specification

Symbol	Parameter	Min	Typ	Max	Units	Remark
VDD	Logic/LCD Input Voltage	3.0	3.3	3.6	[Volt]	
I _{VDD}	LCD Input Current	-	590	710	[mA]	VDD=3.3V at 60 HZ, all Black Pattern
P _{VDD}	LCD Power consumption	-	1.95	2.34	[Watt]	VDD=3.3V at 60 HZ, all Black Pattern
I _{rush LCD}	LCD Inrush Current	-	-	3	[A]	Note 1; VDD=3.3V Black Pattern, Rising time=470us
VDD _{rp}	Allowable Logic/LCD Drive Ripple Voltage	-	-	100	[mA] p-p	VDD=3.3V at 60 HZ, all Black Pattern

Note 1: Measurement condition:



VDD rising time

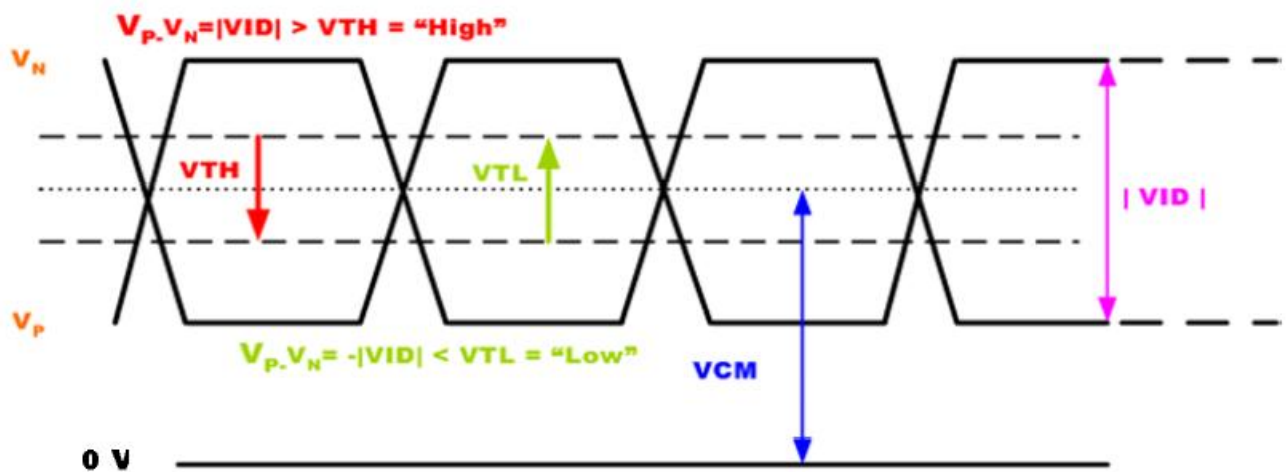
6.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

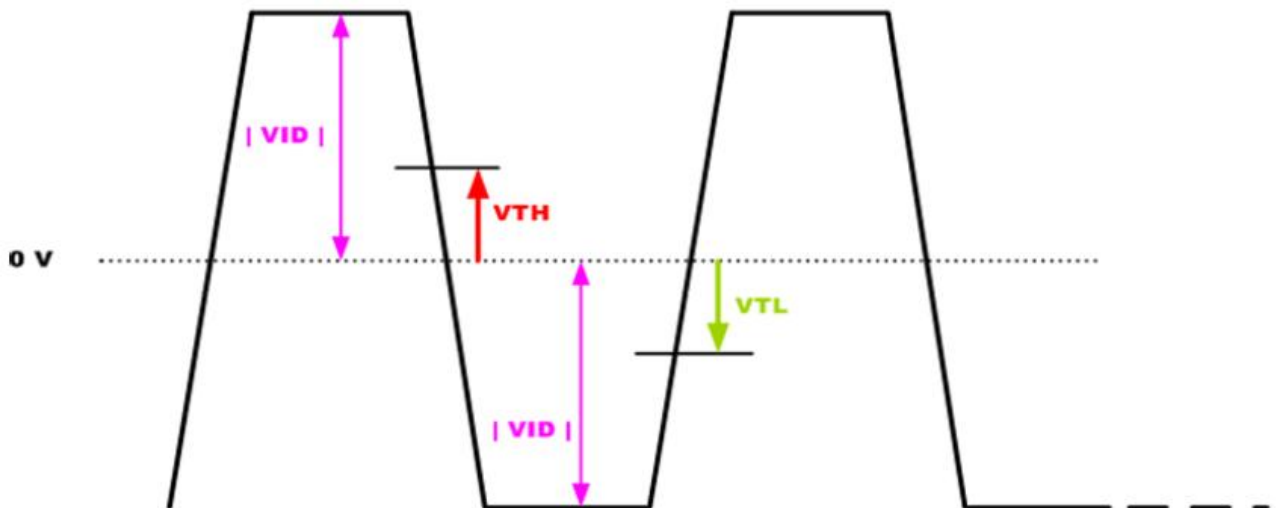
Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VCM=1.2V
VTL	Differential Input Low Threshold	100	-	-	[mV]	VCM=1.2V
VID	Input Differential Voltage	100	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.15	1.2	1.45	[V]	VTH/VTL=±100mV

Note: LVDS Signal Waveform.

Single-end Signal



Differential Signal



6.3 Backlight Unit

Following characteristics are measured under a stable condition using a inverter at 25°C. (Room Temperature)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Remark
VCC	Input Voltage	10.8	12	12.6	[Volt]	
IVCC	Input Current	-	0.6	-	[A]	100% PWM Duty Ta= 25°C
PVCC	Power Consumption	-	7.2	10	[Watt]	100% PWM Duty Ta= 25°C
I _{rush LED}	Inrush Current	-	-	1.5	[A]	at rising time=470us Ta= 25°C
FPWM	Dimming Frequency	200	-	20K	[Hz]	
	Swing Voltage	3	3.3	5.5	[Volt]	
	Dimming duty cycle	5	-	100	%	
IF	LED Forward Current	-	110	-	[mA]	Ta = 25°C
VF	LED Forward Voltage	-	30.33	36	[Volt]	IF = 110mA, Ta = -30°C
		-	27.81		[Volt]	IF = 110mA, Ta = 25°C
		-	26.1		[Volt]	IF = 110mA, Ta = 85°C
PLED	LED Power Consumption	-	3.06	3.96	[Watt]	IF = 110mA, Ta = 25°C
Operation Life		50,000	-	-	Hrs	IF=110mA, Ta= 25°C

Note 1: Ta means ambient temperature of TFT-LCD module.

Note 2: VCC, IVCC, I_{rush LED}, PVCC are defined for LED backlight. (100% duty of PWM dimming)

Note 3: IF, VF are defined for one channel LED. There are two LED channel in back light unit.

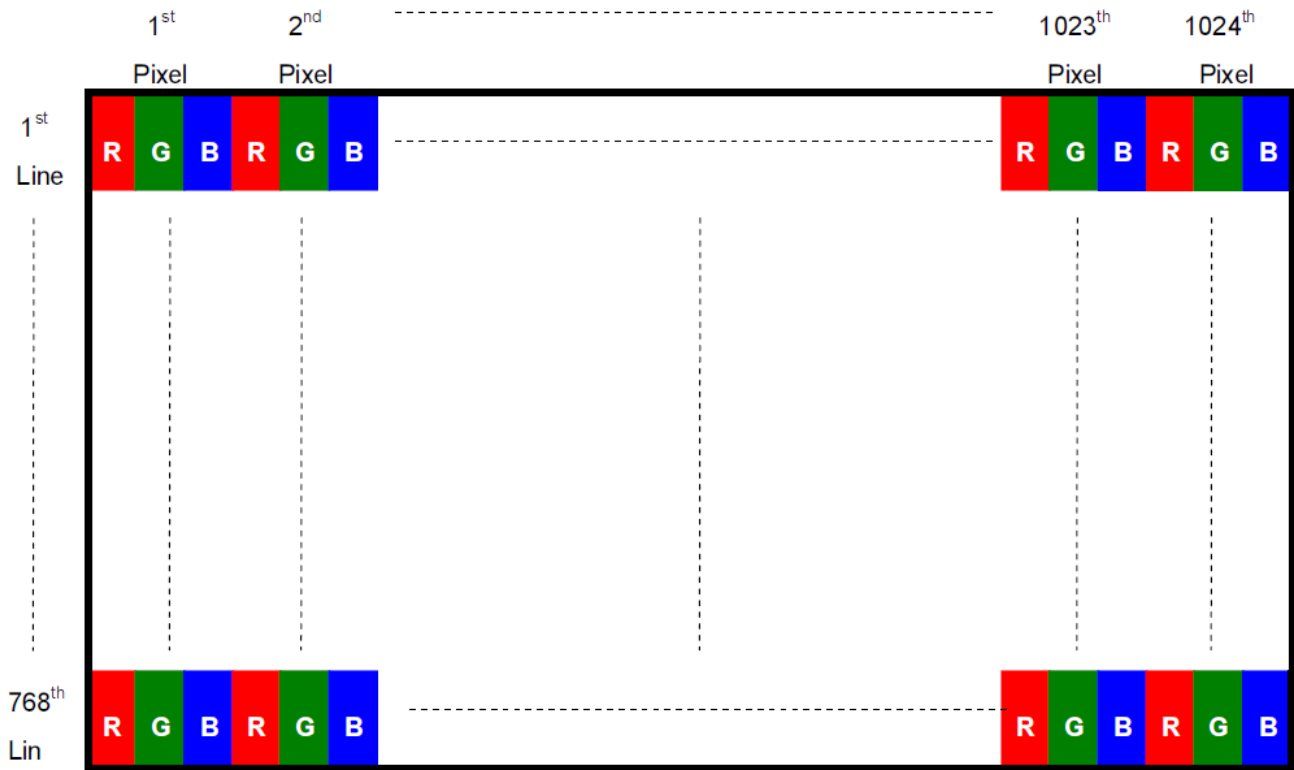
Note 4: If module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

Note 5: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

6.4 Signal Characteristics

6.4.1 Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.



6.4.2 Scanning Direction

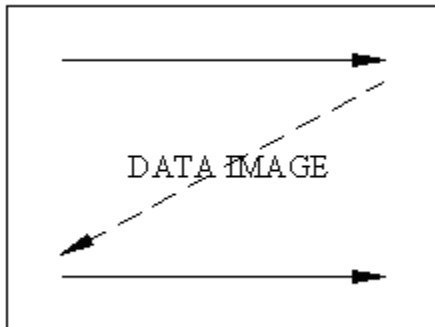


Fig. 1 Normal scan (Pin19= Low or NC)

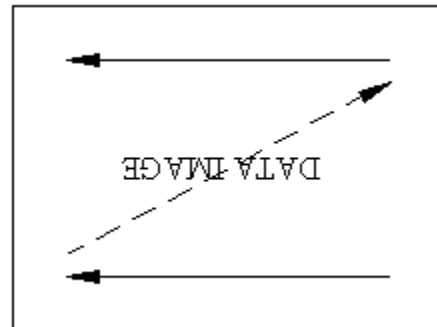


Fig. 2 Reverse scan (Pin19= High)

6.5 Interface Signal Description

Pin NO.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	GND	Ground
4	SEL68	6/ 8bits LVDS data input selection [H: 8bits L/NC: 6bit] *Note4
5	RIN0-	LVDS receiver signal channel 0
6	RIN0+	LVDS Differential Data Input (R0, R1, R2, R3, R4, R5, G0)
7	GND	Ground
8	RIN1-	LVDS receiver signal channel 1
9	RIN1+	LVDS Differential Data Input (G1, G2, G3, G4, G5, B0, B1)
10	GND	Ground
11	RIN2-	LVDS receiver signal channel 2
12	RIN2+	LVDS Differential Data Input (B2, B3, B4, B5, HS, VS, DE)
13	GND	Ground
14	CLKIN-	LVDS receiver signal clock
15	CLKIN+	
16	GND	Ground
17	RIN3-	LVDS receiver signal channel 3, NC for 6 bit LVDS Input. *Note5
18	RIN3+	LVDS Differential Data Input (R6, R7, G6, G7, B6, B7, RSV)
19	RSV	Reverse Scan Function [H: Enable; L/NC: Disable]
20	NC/GND	Reserved for internal test. Please treat it as NC.

Note 1: Input Signals shall be in low status when VDD is off.

Note 2: High stands for “3.3V”, Low stands for “0V”, NC stands for “No Connection”.

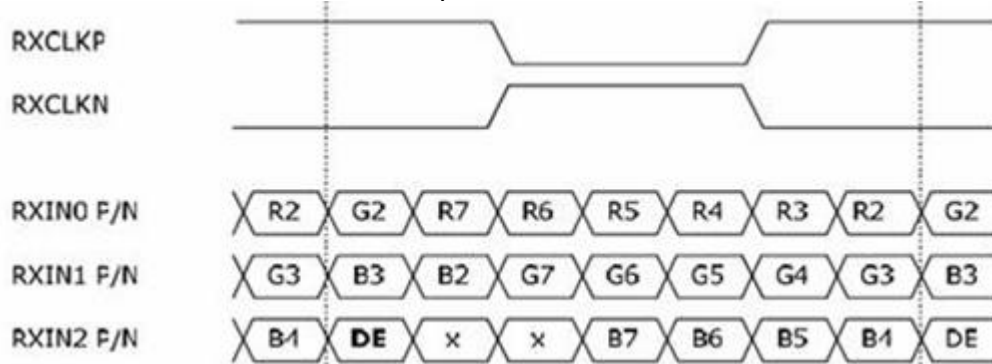
Note 3: RSV stands for “Reserved”.

Note 4: Input signals shall be in low status when VDD is off.

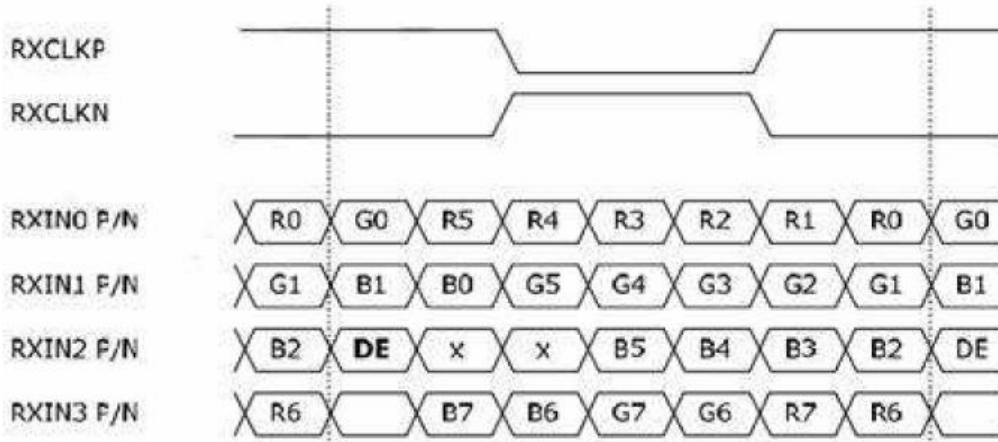
Note 5: If 6 bits mode, please keep the Pin 17 & Pin 18 NC or make sure that the Voltage of Pin 17 is always higher than the Voltage of Pin 18.

6.6 The Input Data Format

SEL68 = "Low" or "NC" for 6 bits LVDS Input



SEL68 = "High" for 8 bits LVDS Input



Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	
+RED5(R5) +RED4(R4) +RED3(R3) +RED2(R2) +RED1(R1) +RED0(R0)	Red Data 5 (MSB) Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB) Red-pixel Data	Red-pixel Data Each red pixel's brightness data consists of these 6 bits pixel data.
+GREEN5(G5) +GREEN4(G4) +GREEN3(G3) +GREEN2(G2) +GREEN1(G1) +GREEN0(G0)	Green Data 5 (MSB) Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0 (LSB) Green-pixel Data	Green-pixel Data Each green pixel's brightness data consists of these 6 bits pixel data.
+BLUE5(B5) +BLUE4(B4) +BLUE3(B3) +BLUE2(B2) +BLUE1(B1) +BLUE0(B0)	Blue Data 5 (MSB) Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB) Blue-pixel Data	Blue-pixel Data Each blue pixel's brightness data consists of these 6 bits pixel data.

CLK	Data Clock	The typical frequency is 65MHz. The signal is used to strobe the pixel data and DE signals. All pixel data shall be valid at the falling edge when the DE signal is high.
DE	Display Timing	This signal is stroked at the falling edge of CLK. When the signal is high, the pixel data shall be valid to be displayed.

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

7. INTERFACE TIMING

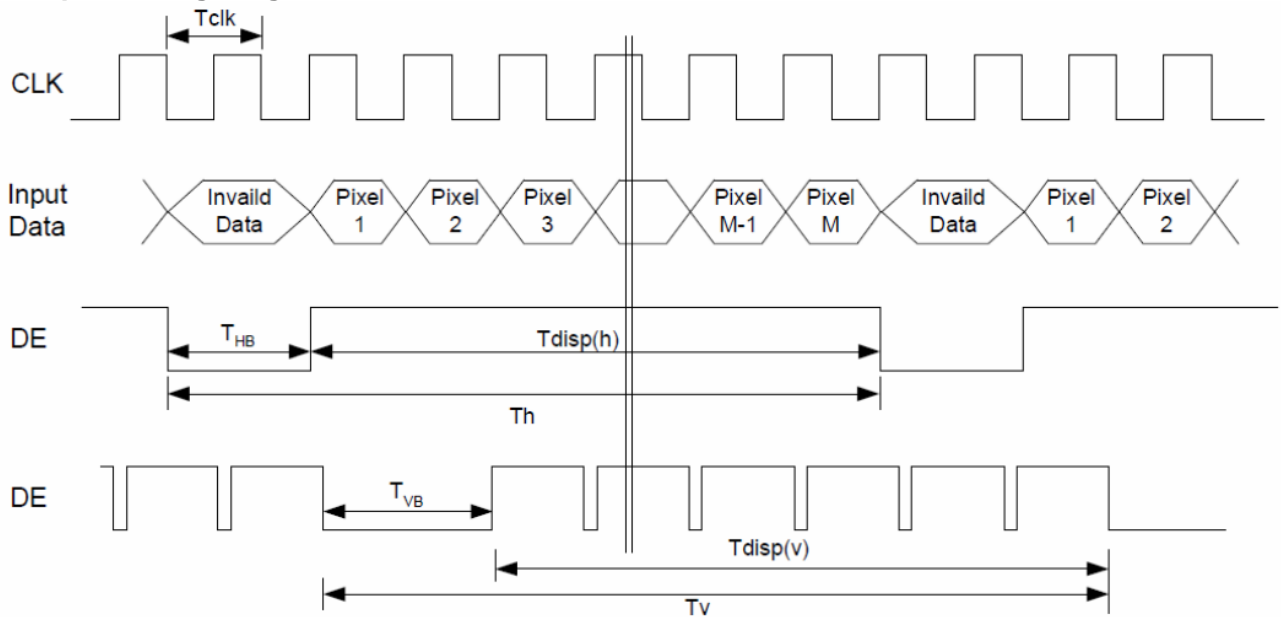
7.1 Timing Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Clock frequency		$1/T_{\text{clock}}$	50	65	80	MHz
Vertical Section	Period	T_v	776	806	1023	T_{Line}
	Active	T_{vD}	-	768	-	
	Blanking	T_{vB}	8	38	255	
Horizontal Section	Period	T_H	1054	1344	2047	T_{clock}
	Active	T_{HD}	-	1024	-	
	Blanking	T_{HB}	40	320	1023	

Note 1: Frame rate is 60 Hz.

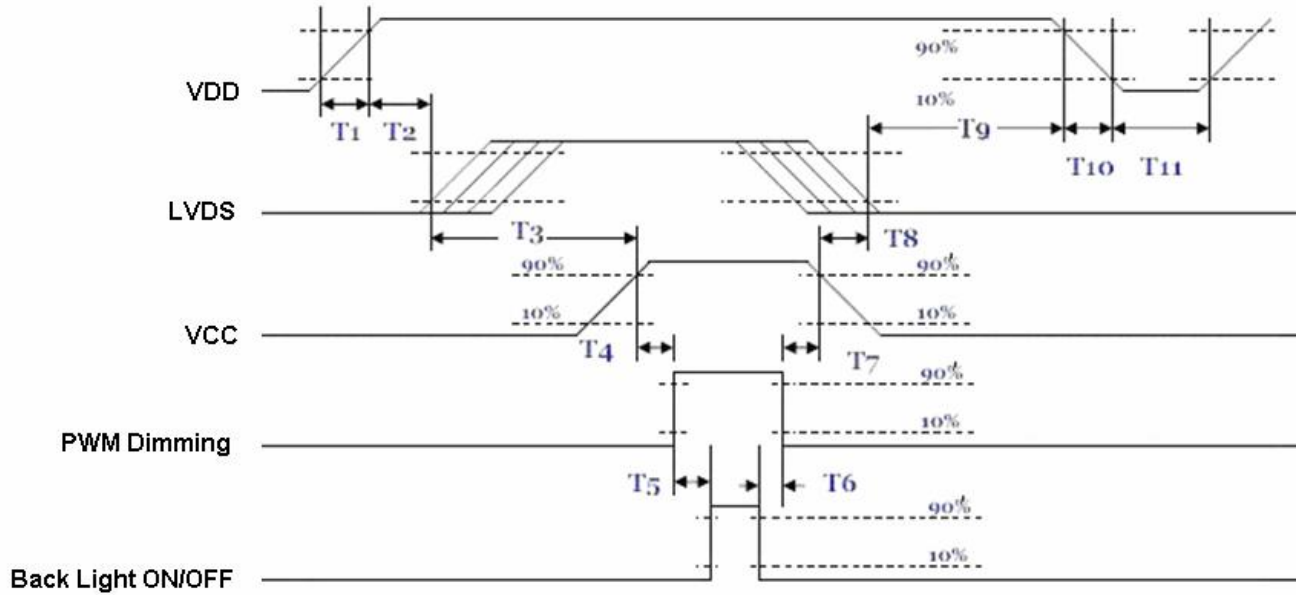
Note 2: DE mode.

7.2 Input Timing Diagram



7.3 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	10	-	-	[ms]
T5	10	-	-	[ms]
T6	0	-	-	[ms]
T7	10	-	-	[ms]
T8	100	-	-	[ms]
T9	0	16	50	[ms]
T10	-	-	10	[ms]
T11	1000	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

8. CONNECTOR & PIN ASSIGNMENT

Physical interface is described as for the connector on module.

These connectors are capable of accommodating the following signals and will be following components.

8.1 TFT-LCD Signal (CN1): LCD Connector

Connector Name / Designation	Signal Connector
Manufacturer	STM or compatible
Connector Model Number	MSB240420-E or compatible
Adaptable Plug	P240420 or compatible

Pin No.	Symbol	Pin No.	Symbol
1	VDD	2	VDD
3	GND	4	SEL68
5	RIN0-	6	RIN0+
7	GND	8	RIN1-
9	RIN1+	10	GND
11	RIN2-	12	RIN2+
13	GND	14	CLKIN-
15	CLKIN+	16	GND
17	RIN3-	18	RIN3+
19	RSV	20	NC/GND

8.2 LED Backlight Unit (CN2): Driver Connector

Connector Name / Designation	Lamp Connector
Manufacturer	ENTERY or compatible
Connector Model Number	3808K-F05N-02R or compatible
Mating Model Number	H208K-P05N-02B or compatible

Pin No.	Symbol	Description
Pin1	VCC	12V input
Pin2	GND	GND
Pin3	ON/OFF	5V-ON,0V-OFF
Pin4	Dimming	PWM
Pin5	NA	

8.3 LED Backlight Unit(CN4) : Light bar Connector

Connector Name / Designation	Lamp Connector
Manufacturer	ENTERY or compatible
Connector Model Number	H208K-P03N-02B or compatible
Mating Model Number	3808K-F03N-02R or compatible

Pin No.	Symbol	Description	Color
Pin1	H	LED anode	Red
Pin2	L	LED cathode	White
Pin3	L	LED cathode	Black

9. QUALITY ASSURANCE

9.1 Test Condition

9.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

9.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

9.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

9.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

9.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	T=85°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-30°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=85°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-30°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity Operation Test	T=40°C,90%RH,240hrs	IEC68-2-2
6	Thermal Cycling Test (No operation)	-20°C → +25°C → +60°C ,100 Cycles 30 min 5 min 30 min	IEC68-2-14
7	Vibration Test (No operation)	1.5G, random 10Hz~200Hz 30 minutes for each Axis (X, Y,Z)	IEC68-2-6
8	Shock Test (No operation)	50G, 20ms Direction : ± X,± Y,± Z Cycle : 1 times	IEC68-2-14
9	ESD Test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC-61000-4-2

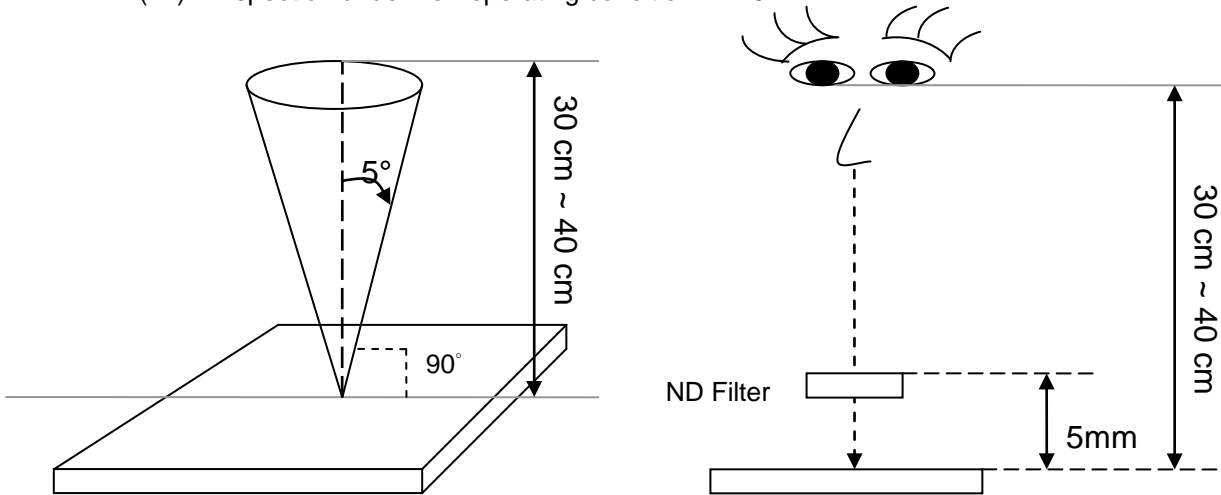
9.2 Inspection condition

9.2.1 Inspection conditions

9.2.1.1 Inspection Distance: 35 ± 5 cm

9.2.1.2 View Angle:

- (1) Inspection under operating condition : $\pm 5^\circ$
- (2) Inspection under non-operating condition : $\pm 45^\circ$



9.2.1.3 Environment conditions:

Ambient Temperature :		$25 \pm 5^\circ\text{C}$
Ambient Humidity :		$65 \pm 5\%$
Ambient Illumination	Cosmetic Inspection	500 ~ 800lux
	Functional Inspection	300 ~ 500lux

9.2.2 Definition of applicable Zones



9.3 Inspection Parameters

No.	Parameter	Criteria																		
1	Operating	Display function: No Display malfunction (Major)																		
		Contrast ratio (Black, White): Does not meet specified range in the spec. (Major) (Note:3)																		
		Line Defect: No obvious Vertical and Horizontal line defect in bright, dark and colored. (Major) (Note:1)																		
		Point Defect (Red, green, blue, dark): Active area ≤ 8 dots (Minor)(Note:1)																		
		<table border="1"> <thead> <tr> <th>Item</th> <th>Acceptable number</th> <th>Total</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td>Bright</td> <td>4</td> <td rowspan="2">8</td> <td rowspan="4">Minor</td> <td rowspan="4">1.5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> <tr> <td>Adjacent Bright</td> <td>1</td> <td>1</td> </tr> <tr> <td>Adjacent Dark</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Class Of Defects	AQL Level	Bright	4	8	Minor	1.5	Dark	4	Adjacent Bright	1	1	Adjacent Dark	1	1
		Item	Acceptable number	Total	Class Of Defects	AQL Level														
		Bright	4	8	Minor	1.5														
		Dark	4																	
		Adjacent Bright	1	1																
		Adjacent Dark	1	1																
Non-uniformity: Visible through 2%ND filter white, R, G, B and gray 50%pattern. (Minor)																				
Foreign material in Black or White spots shape ($W > 1/4L$) (Note: 5)																				
<table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Class Of Defects</th> <th>AQL Level</th> </tr> </thead> <tbody> <tr> <td>$D \leq 0.3$</td> <td>*</td> <td rowspan="3">Minor</td> <td rowspan="3">1.5</td> </tr> <tr> <td>$0.3 < D \leq 0.5$</td> <td>4</td> </tr> <tr> <td>$D > 0.5$</td> <td>0</td> </tr> </tbody> </table>	Dimension	Acceptable number	Class Of Defects	AQL Level	$D \leq 0.3$	*	Minor	1.5	$0.3 < D \leq 0.5$	4	$D > 0.5$	0								
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$0.3 < D \leq 0.5$	4																			
$D > 0.5$	0																			
$D = (\text{Long} + \text{Short}) / 2$ * : Disregard																				
Foreign Material in Line or spiral shape ($W \leq 1/4L$) (Note: 4)																				
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		Bezel appearance: uneven (Minor)																		
		Scratch on the Touch panel : (Note:2)																		
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Polarizer flaw or leak out resin : Defect is defined as the active area.																				

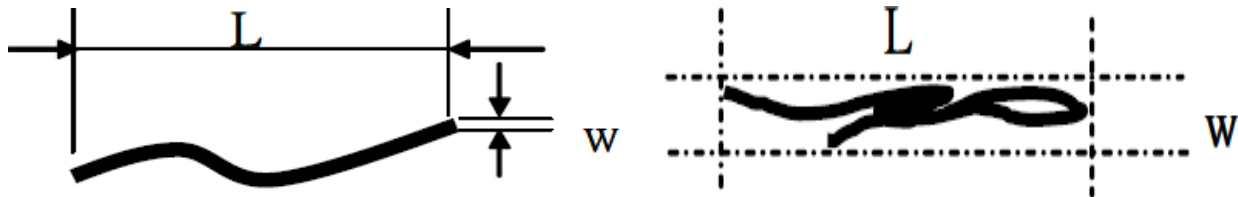
		Definition	
Class of defects	Major	AQL 0.65	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
	Minor	AQL 1.5	It is a defect that will not result in functioning problem with deviation classified.

- Note:1.(a)Bright point defect is defined as point defect of R,G,B with area >1/2 dot respectively
 (b)Dark point defect is defined as visible in full white pattern.
 (c)The point defect must under 2% ND Filter visible .

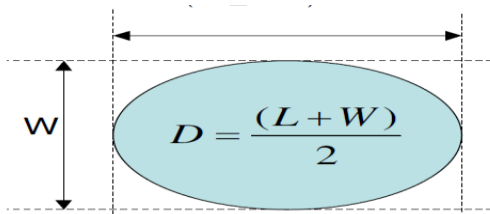
Note:2 The external inspection should be conducted at the distance 35 ± 5 cm between the eyes of inspector and the panel .

Note:3 Luminance measurement for contrast ratio is at the distance 50 ± 5 cm between the detective head and the panel with ambient luminance less than 1 lux. Contrast ratio is obtained at optimum view angle.

Note:4 W-Width in mm , L-length of Max.(L1,L2) in mm.



Note:5 Spot Foreign Material ($W \geq L/4$)



9.4 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

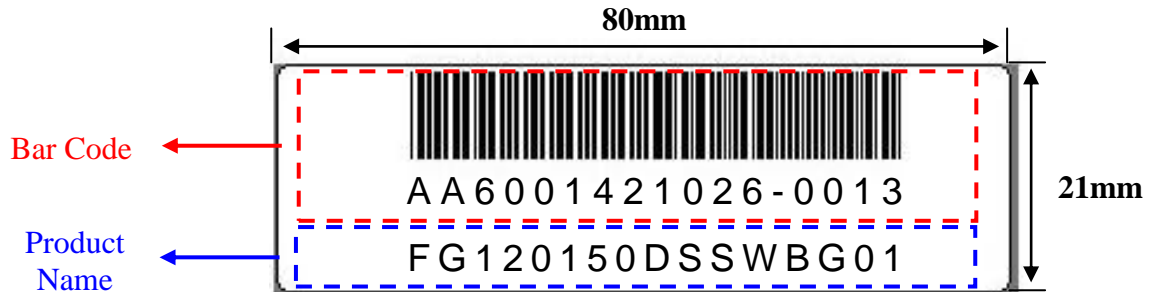
Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

Inspection level: Level II

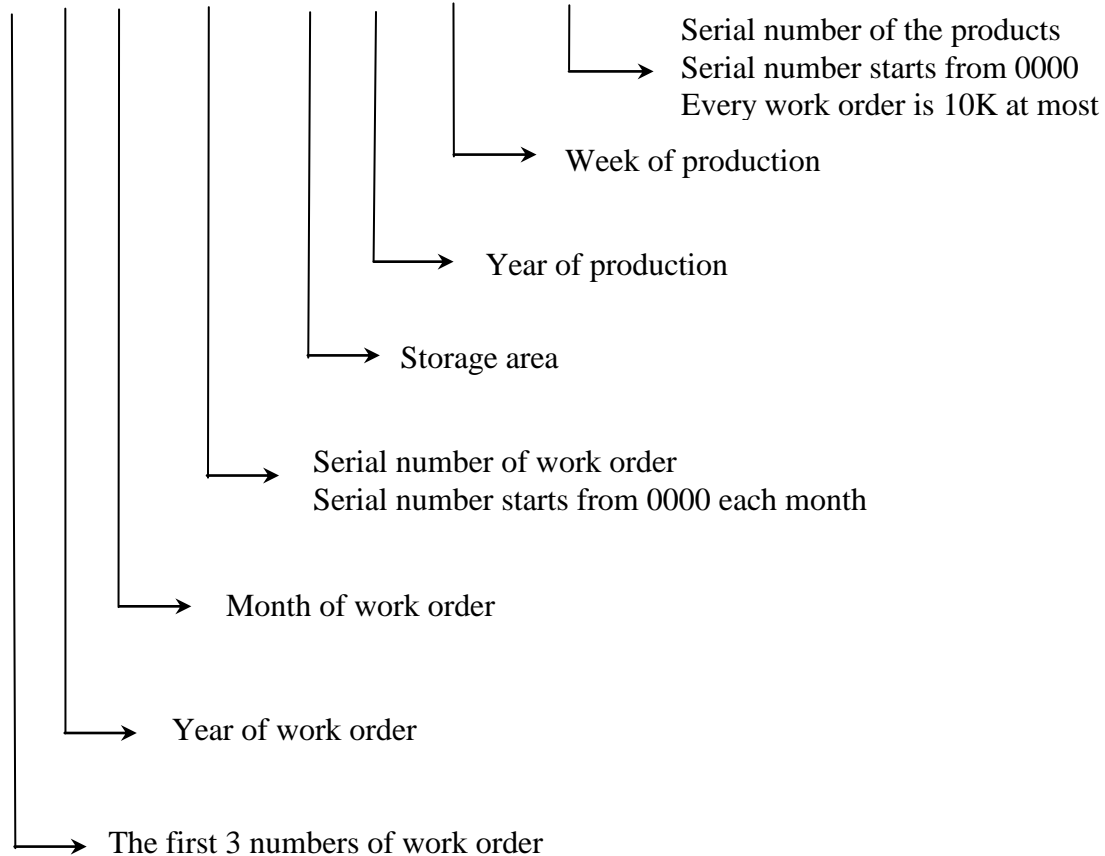
10. LCM PRODUCT LABEL DEFINE

Product Label style:

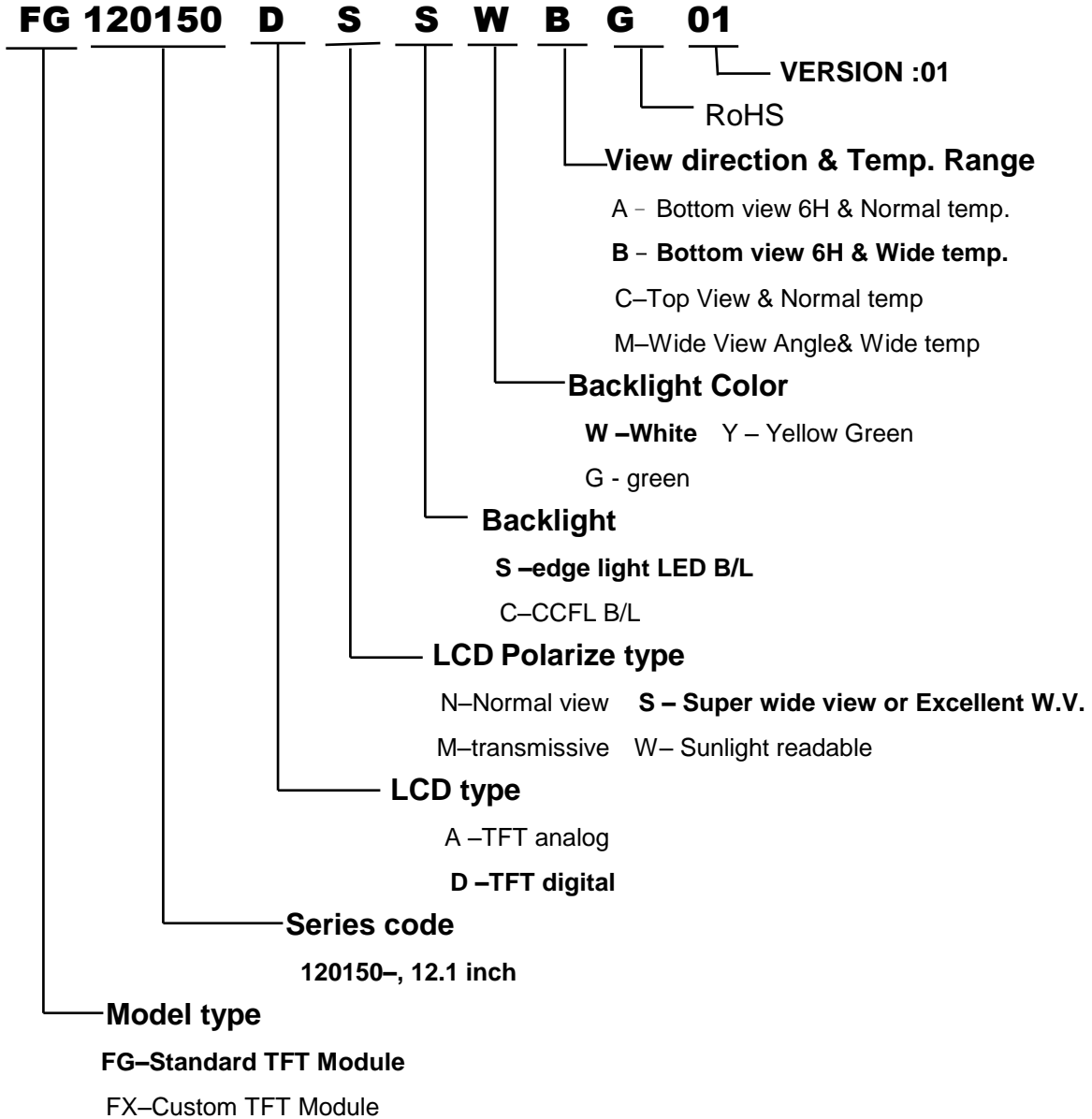


BarCode Define:

A A 6 0014 2 10 26-0013



Product Name Define:



11. PRECAUTION IN USE LCM

1. ASSEMBLY PRECAUTIONS

- (1.) You must mount a module using holes arranged in four corners or four sides.
- (2.) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3.) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4.) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5.) Do not open the case because inside circuits do not have sufficient strength.
- (6.) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7.) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8.) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body

- (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
- (3) Only properly grounded soldering irons should be used.
- (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

4. STORAGE PRECAUTIONS

- (1) When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave the LCDs in the environment of low temperature; below -20°C.

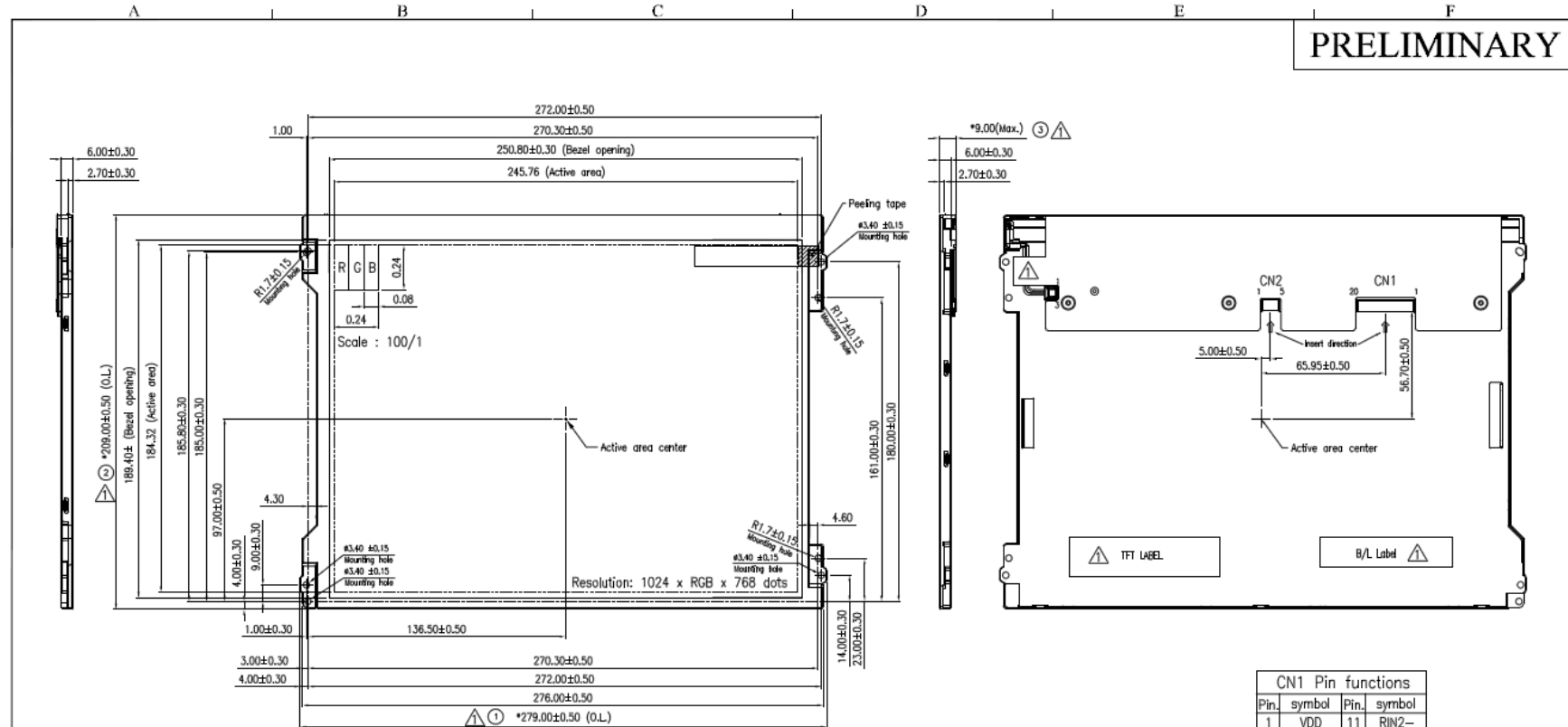
5. OTHERS

- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
 - (1.) Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
 - (2.) Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
 - (3.) Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

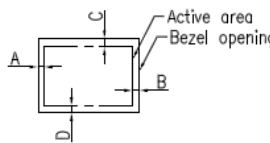
6. LIMITED WARRANTY

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

Confidential Document
12. OUTLINE DRAWING



- Note:
- For RoHS
 - Obliquity tolerance of display area shown as right
 X-Direction: A-B <=1.0mm
 Y-Direction: C-D < 1.0mm
 - Tolerance is ±0.5mm unless otherwise noted.
 - CN1 : The Interface connector is STM MSB240420 or equivalent
 Matching connector is P240420 or equivalent
 - CN2 : The LED power connector is E&T 3808K-F05N-02R
 Matching connector is H208K-P05N-02B or equivalent
 - Luminance : 375 cd/m²(min), 500 cd/m²(typ)
 - * is important dimension. Ⓢ ~ Ⓣ ⚠



CN1 Pin functions			
Pin	symbol	Pin	symbol
1	VDD	11	RIN2-
2	VDD	12	RIN2+
3	GND	13	GND
4	SEL68	14	CLKIN-
5	RINO-	15	CLKIN+
Pin1	VCC	6	RINO+
Pin2	GND	7	GND
Pin3	ON/OFF	8	RIN1-
Pin4	Dimming	9	RIN1+
Pin5	NA	10	GND
		20	NC/GND

				DATE:	03/02/12'	TITLE:		LCM OUTLINE DIMENSION									
				DRAWN:		DWG. NO.		FG120150SG01									
				CHECK:		UNITS		M M									
				APPROVE:		SCALE		N/A									
<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPROVED</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Modify Label dimension & Add number mark & modify design</td> <td>ECR 110-F70035</td> <td>201507/27</td> </tr> </tbody> </table>				REVISIONS	DESCRIPTION	DATE	APPROVED	1	Modify Label dimension & Add number mark & modify design	ECR 110-F70035	201507/27			REV. 2		SHEET 1 OF 1	
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1	Modify Label dimension & Add number mark & modify design	ECR 110-F70035	201507/27														



13. PACKAGE SPECIFICATION

TBD